CMFRI Special Publication No. 83 ISSN : 0972-2351

MANGROVE ECOSYSTEMS

A MANUAL FOR THE ASSESSMENT OF BIODIVERSITY

A follow up of the
National Agricultural Technology Project
(NATP.), ICAR.

Mangrove Ecosystem Biodiversity :
Its Influence on the Natural Recruitment of
Selected Commercially Important Finfish and Shellfish
Species in Fisheries

Edited by :
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Central Marine Fisheries Research Institute
(Indian Council of Agricultural Research)
P.B. No. 1603, Ernakulam North P.O; Cochin – 682 018, Kerala, India

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ISSN : 0972-2351

CMFRI Special Publication No. 83

Edited by :
Dr. George J. Parayannilam

Editorial assistance :
Mr. P. K. Jayasurya
Dr. Ansy Mathew

Cover design :
Sreejith K. L.

Price :
Indian Rs. 600/-
Foreign $ 60/-

Printed at :
Niseema Printers & Publishers, Cochin - 18. Kerala, India. Ph : 0484-2403760

Craft & Gear in Mangroves - Responsible Fishing

George J. P., M. Srinath, C. Ramachandran, and S. Dam Roy

How to reconcile livelihood concerns of the marginalized people who inhabit the mangrove areas with that of resource conservation. It is indeed the Achilles' heel of any mangrove management programme especially when designed in the context of a paradigm of Responsible fisheries as being advocated the world over.

The FAO code of conduct for responsible fisheries is a landmark document ever produced in the history of world fisheries management. It is a consensus declaration signed by more than 180 member countries of the United Nations. This voluntary instrument was adopted by FAO in 1995. It covers a wide range of fisheries –related activities, including fisheries management, fishing operations, post-harvest practices, trade and fisheries research. The code includes many provisions that support a shift to ecologically responsible fishing. It calls on Governments to apply the precautionary approach, stating that the absence of scientific certainty should not be a reason for failing to take action (FAO code article 6.5).

According to Article 6.8 of the code "all critical fisheries habitats in marine and fresh water ecosystems, such as mangroves, wetlands, reefs, lagoons, nursery and spawning areas should be protected and rehabilitated as far as possible". Particular effort should be made to protect such habitats from destruction, degradation, pollution and other significant impacts resulting from human activities that threaten the health and viability of the fishery resources. At the same time the code also provides that "States should protect the rights of fishers and fish workers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to their livelihood, as well as preferential access to traditional fishing grounds "where appropriate" (Article 6.18).

Obviously it is difficult to resolve this contradiction through legislative measures or enforcement of rules. What is required is facilitating voluntary affirmative action by the stakeholders either to avoid or minimize the use of destructive fishing methods in these critical habitats. A possible stepping stone in this direction would be to make the stakeholders aware about the harmful effects, current as well as what is likely to happen in future, of their fishing activities. In this context a brief discription of the different types of fishing gears prevalent in mangrove areas of the country is given below. In addition suggestions to mitigate and minimize the harmful impacts while operating these gears have also been proposed.

1.Cast net

This is a very common gear operated in shallow confined water areas. The operator requires skill to

Fishing by cast net - a common pratice mostly in the lentic water bodies

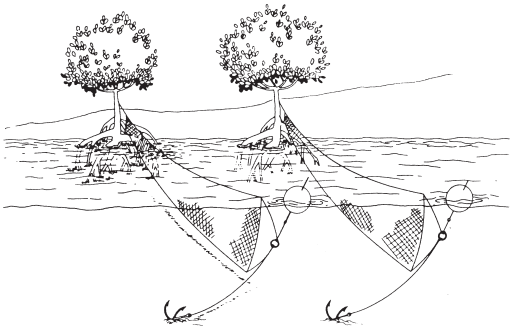
handle in casting the net. Depending on the area, nature of underwater terrain and depth of operation, cast nets of varying sizes and mesh are being used in mangrove areas. The total length of the net varies from 2.5 m to 4.5m when fully cast.

2. Seine nets

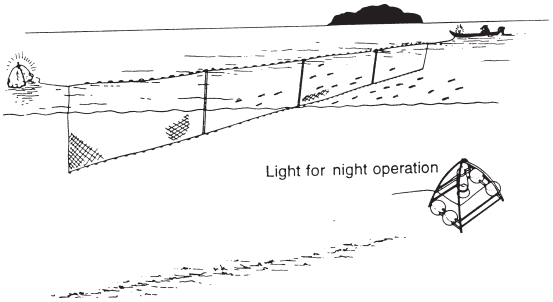
These are encircling nets used mostly in shallow areas. Sometimes fishermen drag and encircle the particular stretch of water body while one end of the net is pulled from the shore. Only organisms of relatively small sizes get caught in these nets and allowed larger ones escape.

3. Gill nets

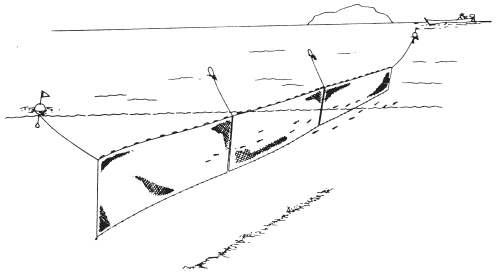
Gillnets are usually used in 2 to 3.5 m deep waters. It has a length of 20 to 40 m and an approximate mesh size of 10 to 60 mm. In some areas, especially creeks, it is used from shore to shore during high tides.



Gill net (passive gear) set out from the bank
(English, S., Wilkinson C. & Baker, V 1997)



Gill net (passive gear) set on the surface. Nets may be anchered or allowed to drift
(English, S., Wilkinson C. & Baker, V 1997)



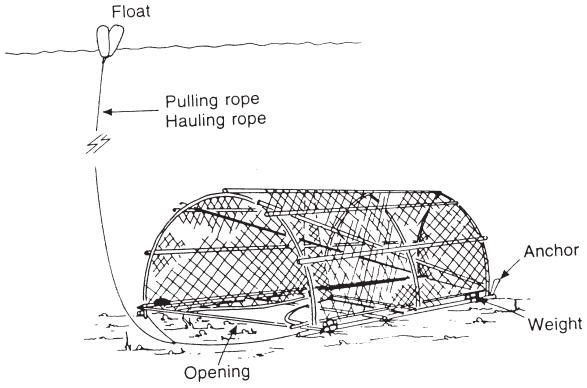
Gill net (passive gear) set in mid water. Nets may be anchored or allowed to drift.
(English, S., Wilkinson C. & Baker, V 1997)

4. Purse seines

Purse seines are not common in mangroves. However fishermen resort to this gear during occasions like off-season or when fishing is banned in the sea. The mesh size varies from 2 to 3.5 cm. Purse seines are very rarely employed in mangrove areas in Kerala.

5. Traps

a. Fixed traps: Fixed traps are very commonly used in mangroves. Long stretches of mangrove areas are seen covered with nets fixed from bottom to surface usually a few feet above the water level using poles that keep the net stretched across shores. The net remains partly submerged during high tide. There is an opening in the centre of the stretched net where the trap is fixed. As the tide recedes water level decreases and the mangrove areas emerge, various aquatic organisms get trapped since there is only one exit from the net. Fishes are scooped out of the traps. This type of fishing is common in mangroves of Northern Kerala.



Fish trap (passive gear)
(English, S., Wilkinson C. & Baker, V 1997)

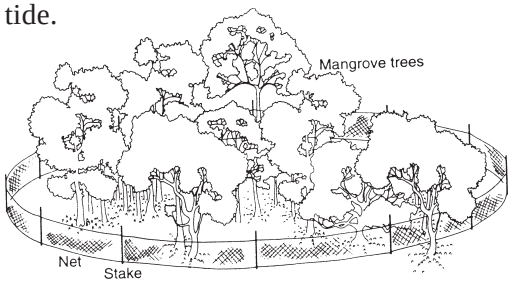
Fish trap in the mangrove

b. Basket traps: Mostly women engage in this type of fishing and they use baskets made of bamboo splits. It is more or less oval in shape with three sides elevated while the one side is open. The scooping is done by the open side. Twigs or small branches of mangrove plants are kept inside the basket to attract the fishes. Mostly very small size prawns or juveniles of prawns are trapped by this method.

Basket trap

6. Encircling

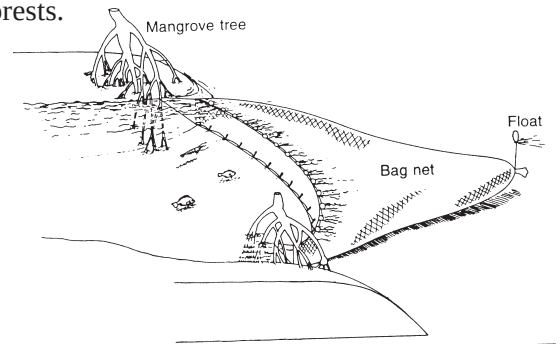
600 m circumference, mesh size 10 to 20mm, expensive, labour intensive, can be operated only in small isolated patches of mangroves. The net is fixed on high tied and fishes are collected during low tide.



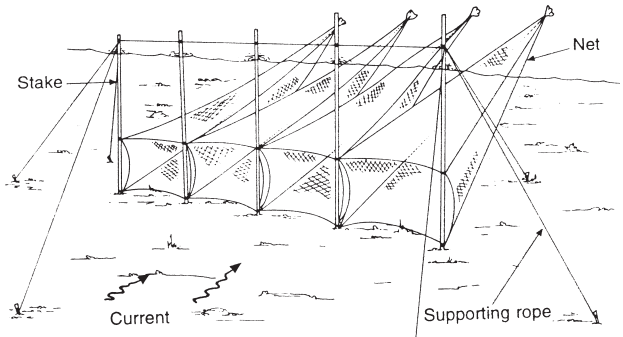
Encircling net (passive gear)
(English, S., Wilkinson C. & Baker, V 1997)

7. Bag nets

Operation depends on well defined catchment areas. Chances of escape of fish more from forest floor. Usually mesh size 1.4 cm for fish and 3 mm for shrimp. The bag net set on frinches of mangrove forests.



Bag net (passive gear)
(English, S., Wilkinson C. & Baker, V 1997)



Bag net (passive gear) commercial gear set in main stream. Usual catch comprises migratory species
(English, S., Wilkinson C. & Baker, V 1997)

8. Hand picking

Hand picking of prawns is done by women . The quantity varies from 0.75 kg to 2.25 kg /head for a period of 2-3 hours of labour. They sell it at an average rate of Rs 40-60/kg depending on size, species and quality

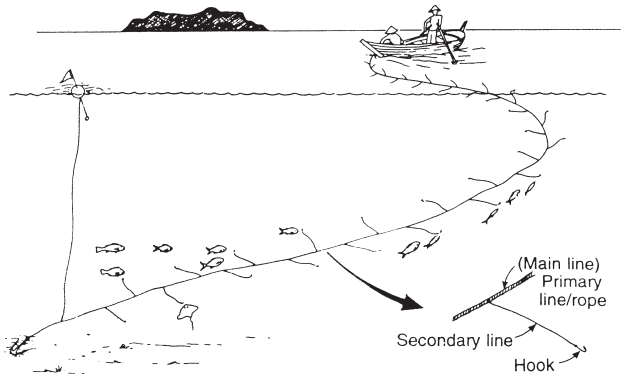
9. Seed collection

Collecting the seeds /larvae for aquaculture purposes by drag net and fixed net operation is a common practice in the mangroves of the country. Larvae of *P. monodon* (mostly in Sunderbans West Bengal) and *P.indicus* (mostly in Kerala) fetch attractive prices to the collectors. Fry and fingerlings of *Mugil spp*, *Etroplus* and *Chanos* are also collected from Kerala mangroves.

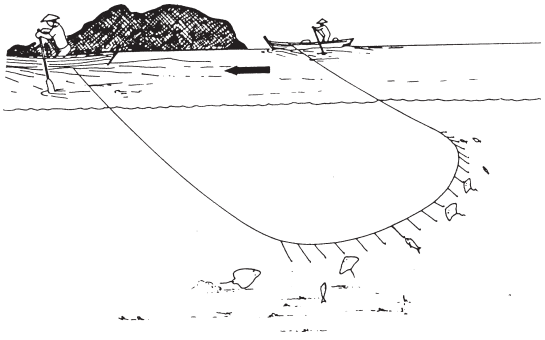
The shallow areas of mangroves are encircled by large plankton nets of mesh size 0.33 mm to collect the larvae, which are stocked in "happas" kept in near shore areas. Later they are scooped by very small hand nets and transported in plastic containers. In Sunderbans fixed nets and individually operated framed dragnets are used to collect *P. monodon*. After dragging a particular stretch the cod end is opened and *P. monodon* is segregated from the collected organisms periodically. The position of the fixed nets are changed depending on the tidal amplitude.

10. Long line

In this operation hooks are attached to a long rope which is laid out from non-mechanized wooden crafts. The line is withdrawn at a pre-determined time to collect the catch. Mostly carnivorous species are caught by this method.



Long line (passive gear) set with baits
(English, S., Wilkinson C. & Baker, V 1997)



Long line (passive gear) without baits
(English, S., Wilkinson C. & Baker, V 1997)

9. Pole and line

This is a very commonly used fishing method in mangrove areas especially for self-consumption. Sometimes this is done using only hooks attached to nylon strings without using poles and is a time consuming operation.

Suggestions for Responsible mangrove fishing

1. Use nets with mesh size that allows the escape of juveniles. Nets with very small mesh size should not be used. However it is suggested that location specific mesh size regulations exclusive for mangroves need to be formulated.
2. Use of gears with selectivity is to be encouraged.
3. Collection of seeds /larvae should be based on proper stock assessment and should be undertaken as a monitored seasonal activity. The mangrove fishing community should be trained to do it in an ecologically sound manner.
4. The community should be made aware through concerted extension interventions about the destruction being unleashed by the use of certain gears like fixed traps to the total fishery stock both in inland and marine sector.
5. Locally adaptable fisheries based alternative employment opportunities should be provided / generated to them by the respective Governments. This can include small-scale hatcheries, eco-friendly aquaculture and integrated fish farming.
6. The eco-tourism potential of mangrove regions can be tapped through imaginative planning and participatory implementation of co-management programmes.

   With well-planned efforts the marginalized people / mangrove community staying in these wetland regions can be transformed into responsible custodians and rational beneficiaries of these ecologically sensitive, but invaluable biosphere areas. What is needed is a separate policy for the ecologically rational utilization of mangroves in each maritime state. Mangrove ecosystem management, conservation and security should be closely linked with the lively-hood security of mangrove community.

Suggested References

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